

(WQ – 4) Irrigation Water Salinity & Sodium Adsorption Ratio (SAR) Assessment Guide

Irrigation Water Lab Analysis for Soluble Salts and SAR (mg/l = milligrams/liter; meq/l = milliequivalents/liter)											
	Major Cations (ions with a positive charge)	example		Enter Lab Results			Major Anions (ions with a negative charge)	example		Enter Lab Results	
		mg/l	meq/l	mg/l	meq/l			mg/l	meq/l	mg/l	meq/l
Hardness	Calcium (Ca ⁺⁺) 20.04 mg/meq	80	4			Alkalinity	Chloride (Cl ⁻) 35.46 mg/meq	92	2.6		
	Magnesium (Mg ⁺⁺) 12.16 mg/meq	14	1.2				Sulfate (SO4 ⁻⁻) 48.03 mg/meq	192	4		
	Sodium (Na ⁺) 22.99 mg/meq	115	5				Bicarbonate (HCO3 ⁻) 61.02 mg/meq	183	3		
	Potassium (K ⁺) 39.10 mg/meq	8	0.2				Carbonate (CO3 ⁻⁻) 30.01 mg/meq	6	0.2		
	Sum of Total Cations:	217	10.4				Sum of Total Anions:	473	9.8		
Total Dissolved Solids (i.e., Soluble Salts) is: 217 mg/l + 473 mg/l = 690 mg/l (or 690 ppm). 0.23 x TDS (ppm) = lbs. of salts/ac-in 690 mg/l ÷ 640 ≈ ECiw of 1.1 dS/m (i.e., Electrical Conductivity of Irrigation Water in decisiemens/meter)											
Irrigation Water Salinity Assessment											
Salinity (Soluble Salts): affects crop water availability Note: Be sure to compare the Irrigation Salinity (ECiw) with the Soil Test (ECe), in order to evaluate the potential yield reduction of your crop (i.e., Refer to a Crop Threshold Soil Salinity (ECe(ct)) Table)							Degree of Restriction on Use – ECiw (dS/m)				
							None	Slight to Moderate		Severe	
							< 0.7	0.7 – 3.0		> 3.0	
Irrigation Water Quality and its potential effects on Infiltration											
The amount of <u>Sodium</u> and <u>soluble salts</u> in the Irrigation Water affects the rate of water infiltration into the soil. This is evaluated using the SAR (Sodium Adsorption Ratio) and Electrical Conductivity of the Irrigation Water (ECiw in dS/m). Use meq/l for calculating the SAR SAR = Na/√(Ca + Mg)/2					SAR		Degree of Restriction on Use – ECiw (dS/m)				
							None	Slight to Moderate		Severe	
					0 – 3		> 0.7	0.7 – 0.2		< 0.2	
					3 – 6		> 1.2	1.2 – 0.3		< 0.3	
					6 – 12		> 1.9	1.9 – 0.5		< 0.5	
					12 – 20		> 2.9	2.9 – 1.3		< 1.3	
					20 - 40		> 5.0	5.0 – 2.9		< 2.9	